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(58) Field of search

F2H

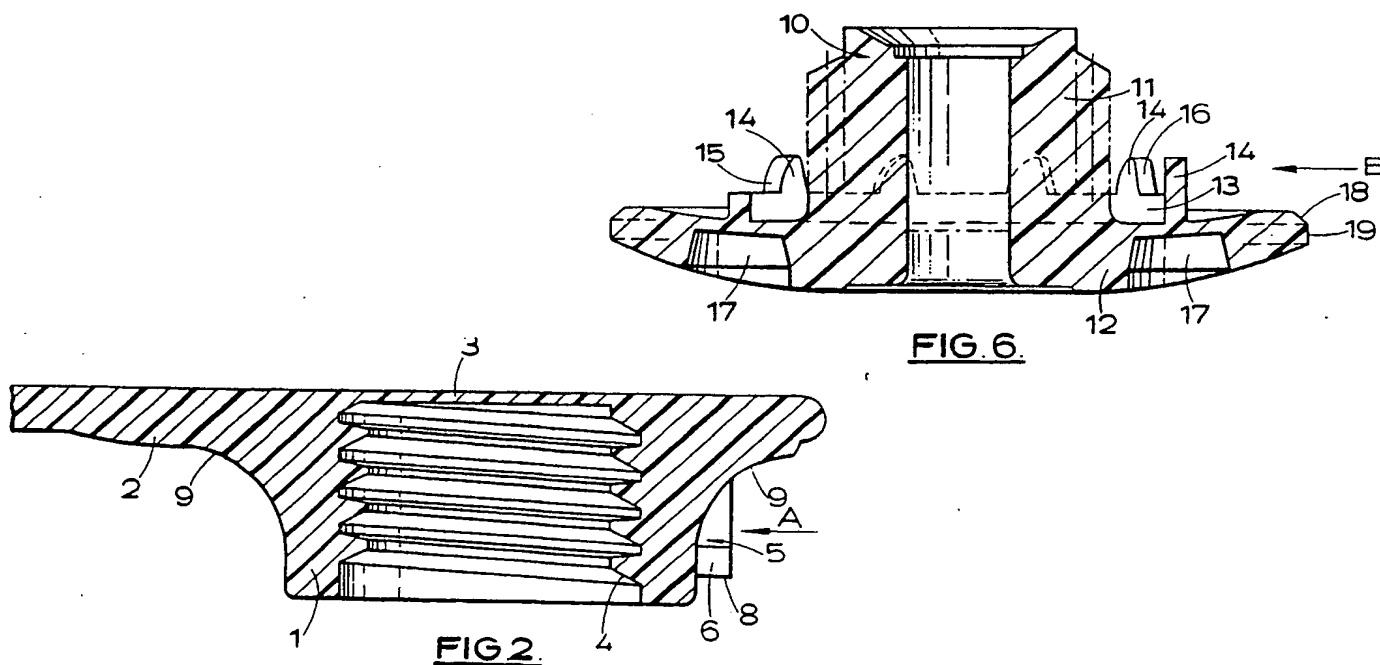
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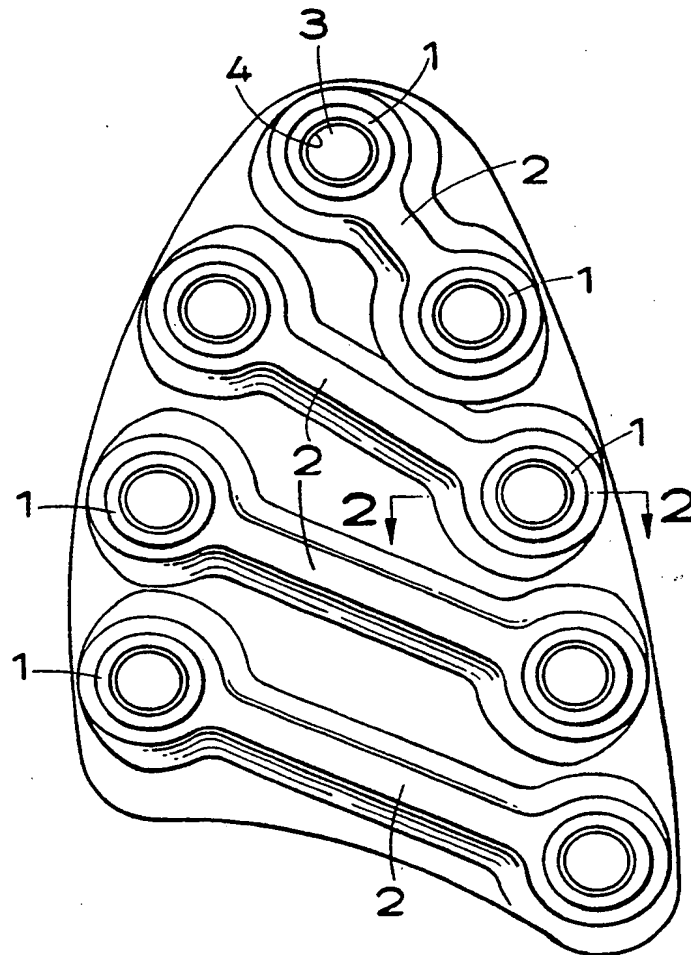
Selected US specifications from IPC sub-classes

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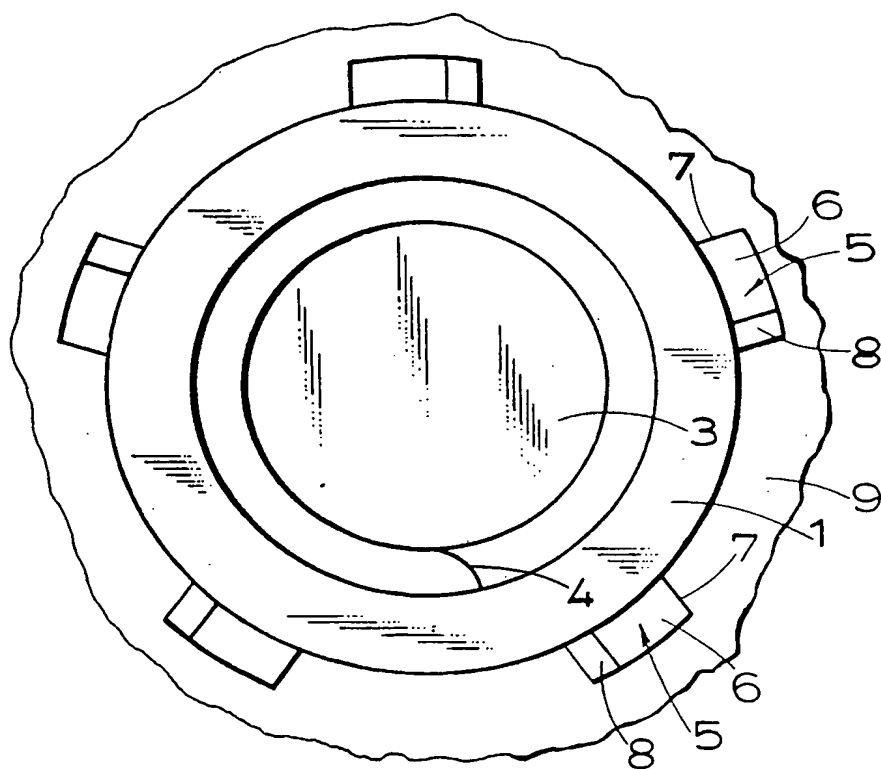
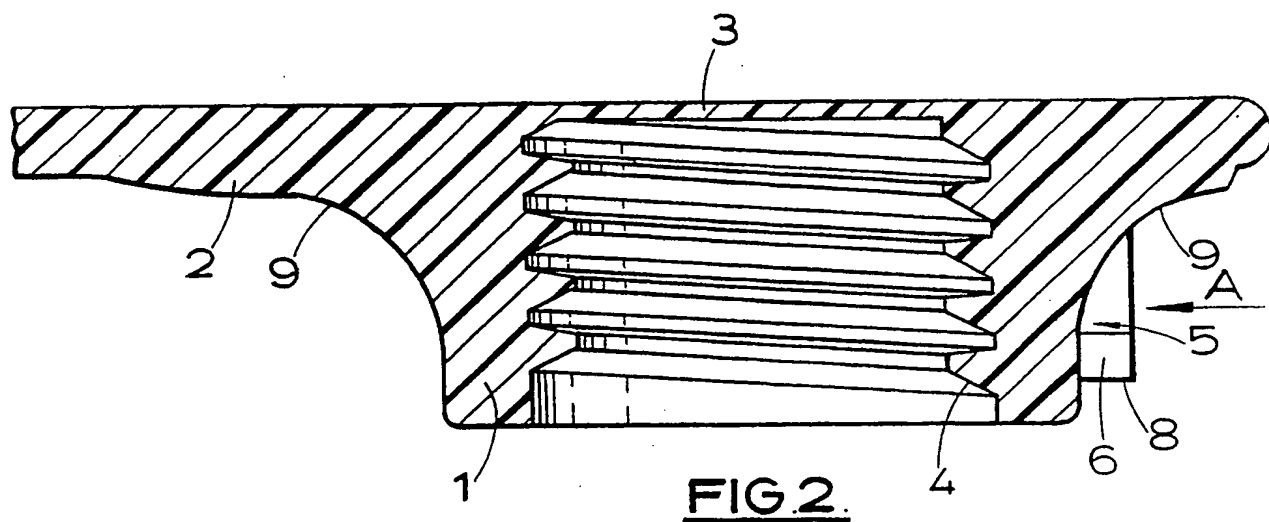
(54) Studded footwear

(57) An internally screw-threaded socket (1) for incorporation in an article of footwear, such as a golf shoe, is provided on its outer surface with teeth (5). A stud (10) includes a flange (12) and an externally screw-threaded spigot (11) which can be screwed into the socket (1). Teeth (14) on the stud (10), spaced outwards from the spigot (11), interengage the teeth (5) on the socket (1) when the spigot (11) is screwed into the socket (1) and prevent the stud (10) being freely unscrewed. The teeth on the stud and socket may be ratchet-shaped so as to make it easier to screw the stud into the socket than to unscrew it. The teeth (14) on the stud (10) are preferably frangible so that at least some of them break off when the stud (10) is unscrewed for replacement. Some of the teeth (14) on the stud (10) are free to assume their natural shape.

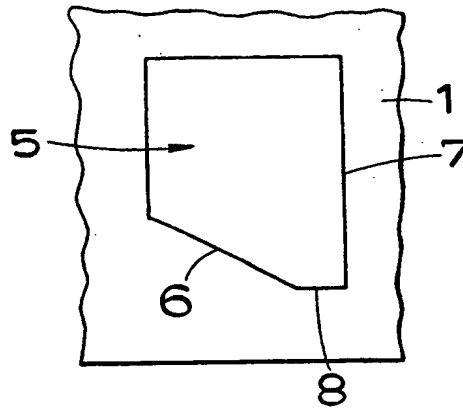
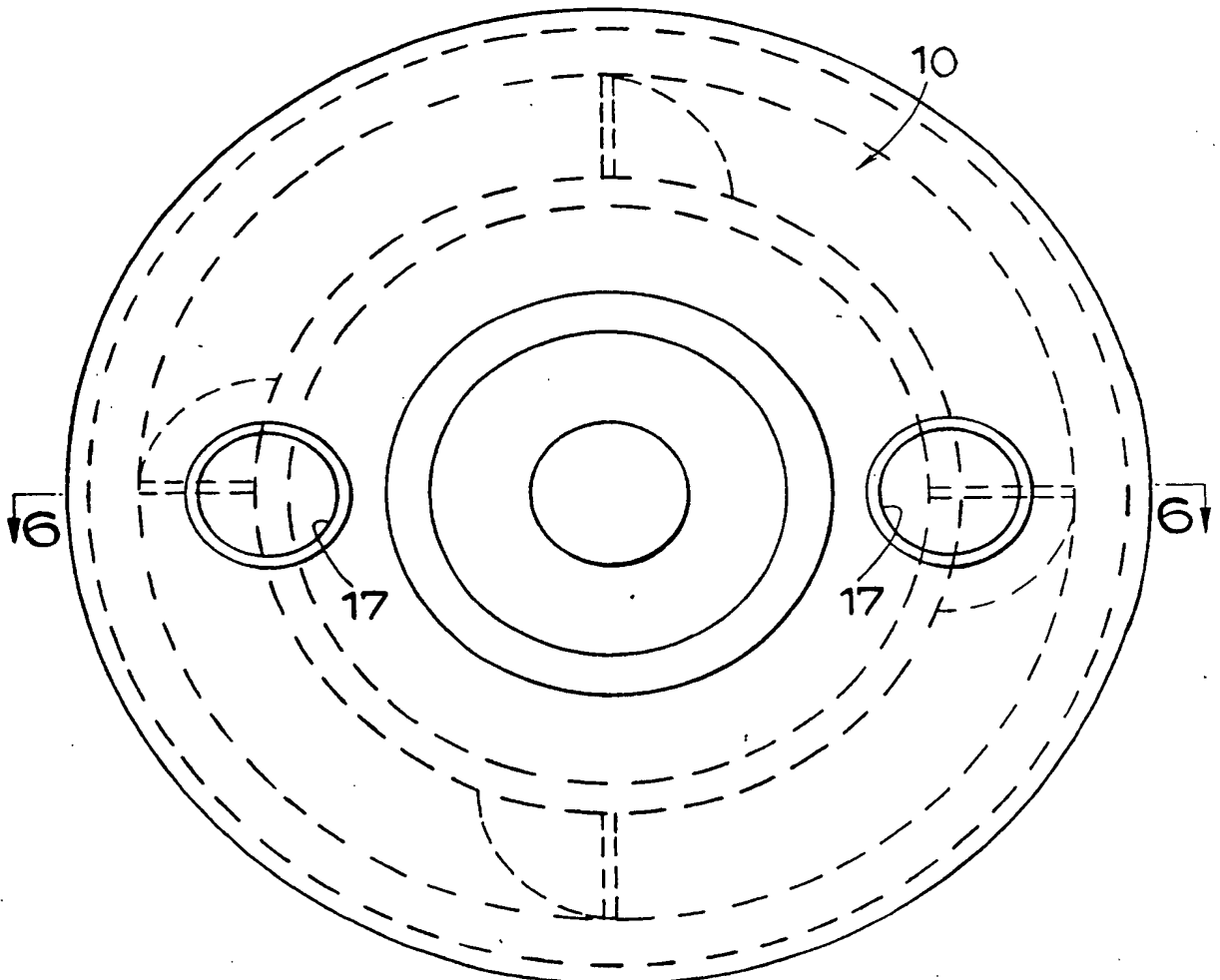


FIG.1.

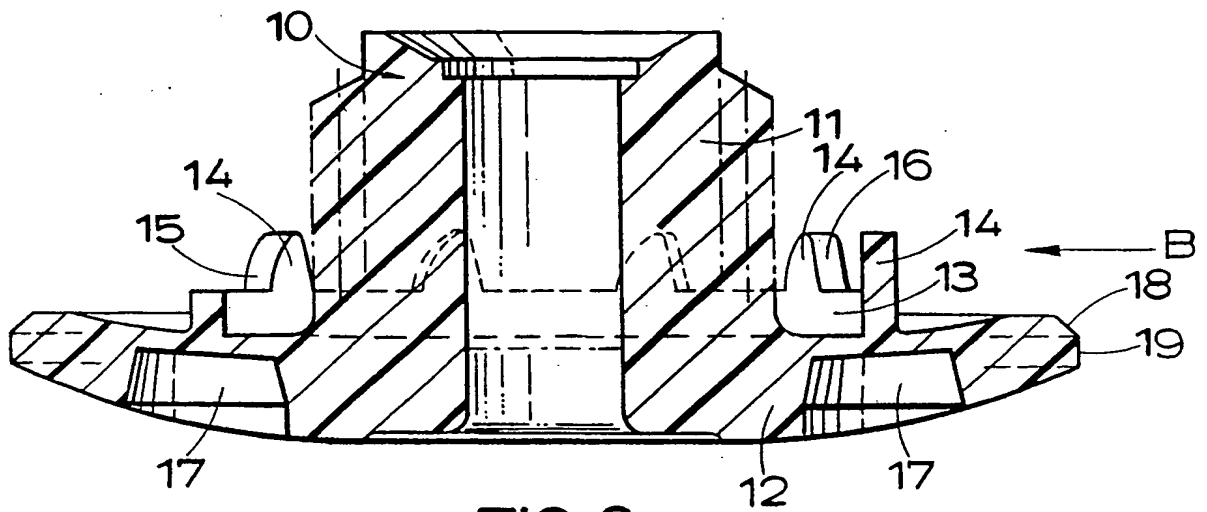
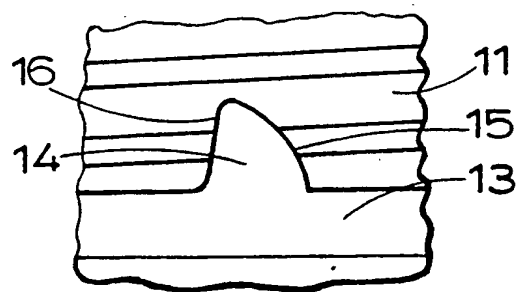
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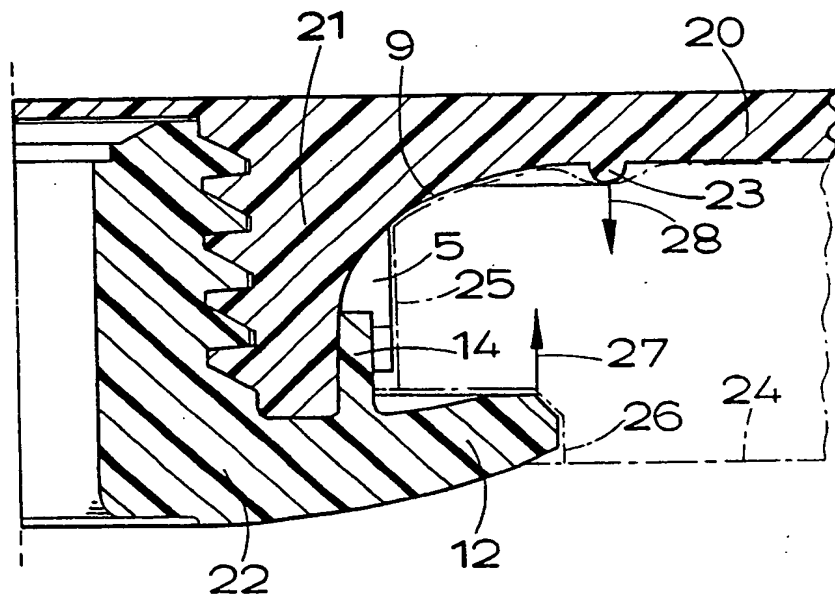
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FIG. 4.FIG. 5.

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FIG. 6.FIG. 7.

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FIG. 8.

STUDED FOOTWEAR

This invention relates to studded footwear, that is to footwear of the kind that is provided with studs or that can be provided with studs.

For convenience of description the term stud is used herein to denote generally any form of projection that in use can engage the ground, the term therefore including both blunt projections and sharp projections of the kind sometimes referred to as spikes.

Also for convenience of description, articles of footwear, studs and their component parts are described as if they were in the orientations they assume in normal use.

It is common practice to provide an article of footwear with a plurality of internally screw-threaded sockets which are open at their lower ends. The sockets may be in the sole or in the heel of the article of footwear, or in both the sole and the heel. A stud for use with an article of footwear of that kind has an externally screw-threaded spigot which can be screwed into a socket. It is desirable for the sockets to be made from plastics materials rather than from metals as in general they are lighter than the equivalent metal sockets and, unlike metal sockets, tend not to corrode. Nevertheless it may be necessary or desirable to take steps to avoid the sockets being damaged when in use. In particular, each stud may be provided with retaining means, such as an upstanding ring, which is spaced outwards from the screw-threaded spigot, the arrangement being such that when the spigot is screwed tightly into a socket, the retaining means resists the tendency for the lower end portion of the

socket to expand outwards to an extent such as might cause the socket to split or to be in danger of splitting. Furthermore, the presence of the retaining means may well enable the stud to be screwed up so
5 tightly that an intermediate part of the socket expands outwards and the socket becomes slightly barrel-shaped. This leads to relatively high frictional forces operating between the stud and the socket, those forces helping to reduce the likelihood
10 of the stud becoming unintentionally unscrewed in use.

Studs and sockets of the kind described above are described and illustrated in more detail in the specification of British patent application No. 8518677
15 (publication No. 2 163 037 A) of Triman Limited.

Nevertheless, it may sometimes happen that a stud is not fully screwed into its associated socket or that a stud works loose. When that occurs there is
20 relatively little resistance to the stud gradually becoming unscrewed. A partially unscrewed stud in an article of footwear can be a danger to a person wearing that article of footwear. Moreover, when a lateral force is applied to a projecting stud, the effects on
25 the associated socket can be damaging; not only is a reduced length of spigot engaged in the socket, but in addition the moment of force applied to the socket is increased as the result of the increased length of that part of the stud projecting from the socket. It is
30 therefore desirable to provide means for reducing the likelihood of a stud becoming inadvertently unscrewed.

An aim of the present invention is to provide such means.

From a first aspect the present invention consists in the combination of an internally screw-threaded socket, for an article of footwear, and a stud with an externally screw-threaded spigot which can be screwed into the socket, the stud being provided with teeth which are spaced outwards from the spigot and can interengage complementary teeth on the outside of the socket, the arrangement being such that in use, when the spigot is screwed into the socket the teeth interengage to prevent the stud being freely unscrewed.

The teeth on the stud are preferably frangible, the arrangement being such that when the spigot of the stud has been screwed into the socket and the teeth on the stud and socket have become interengaged to at least a predetermined extent, the action of unscrewing the stud from the socket causes at least some of the teeth on the stud to break off.

The arrangement is preferably such that in whatever relative rotational positions the stud and socket are when the stud is screwed into the socket, at least some of the teeth on the stud are free to assume their natural shapes rather than being deformed by contact with the teeth on the socket. This can conveniently be achieved by making the number of teeth on the socket different from the number of teeth on the stud. The number of teeth on the socket is preferably less than the number of teeth on the stud. The teeth on the socket are preferably uniformly spaced around the socket, and similarly the teeth on the stud are preferably uniformly spaced around the spigot.

From a second aspect the present invention consists in a stud with an externally screw-threaded spigot which can be screwed into an internally

screw-threaded socket, for an article of footwear, the stud being characterised in that it is provided with teeth which are spaced outwards from the spigot and can engage complementary teeth on the outside of the socket when the spigot is screwed into the socket, that interengagement serving to prevent the stud being freely unscrewed.

The teeth on the stud are preferably ratchet-shaped so that the faces they present to the teeth of a complementary socket, when the stud is being screwed into such a socket, are inclined to the axis of rotation and afford less resistance to rotation than would occur if the faces were parallel with the axis of rotation, while the faces they present to the teeth of that socket when a torque is applied to the stud in the direction necessary for the unscrewing of the stud from the socket are either not inclined to the axis of rotation or are inclined more steeply than the aforementioned faces. The teeth on the stud are preferably provided on a retaining ring spaced outwards from the spigot and adapted to receive an end portion of a complementary socket in the manner and for the purpose described above.

The spigot and the teeth of the stud are preferably formed from a plastics material as parts of the same moulding. The stud preferably has an outwardly directed flange, disposed below the spigot and the teeth, which flange can in use engage the underside of the article of footwear on which the stud is mounted. The lower surface of the flange is preferably of a convex shape, though if desired it could be flat or even concave.

From a third aspect the present invention consists in an internally screw-threaded socket, for an article of footwear, the socket being characterised in that it is provided on its outer surface with a plurality of teeth for interengagement with complementary teeth on a stud having an externally screw-threaded spigot which can be screwed into the socket, that interengagement serving to prevent the stud being freely unscrewed. The teeth on the socket are preferably ratchet-shaped so that the obstruction they afford to the teeth of a complementary stud when it is being screwed into engagement with the socket is less than the obstruction they afford to the teeth on such a stud when it is being unscrewed from the socket. The teeth on the socket are preferably set back from the lower end of the socket so that an end portion of the socket, without teeth, can be received by complementary retaining means on a stud.

The socket could comprise an individually formed component, unconnected to any other socket, and anchored or adapted to be anchored in an article of footwear, but in a preferred arrangement the socket is one of a plurality of similar sockets constituting part of a socket unit incorporated in or adapted to be incorporated in an article of footwear. The socket unit may be incorporated in the sole of an article of footwear or in the heel thereof. A unit designed for incorporation in the sole will be referred to below as a sole plate. The socket unit may be fabricated from pre-formed components but is preferably formed as a unitary moulding of a suitable plastics material or the like. The moulding is preferably in the form of a plate from the underside of which a plurality of sockets project. The upper face of the plate is preferably flat. Likewise, the lower face of the plate

may also be flat, though if desired it may be shaped so that certain areas of the plate, notably around the socket, are thicker than other areas. In a preferred arrangement, thicker areas of the plate form bands, each of which extends across the plate between a pair of associated sockets. The arrangement is preferably such that when the unit is incorporated in the sole of an article of footwear, at least some of the bands extend laterally across the article of footwear rather than lengthwise thereof.

The outer surface of each socket preferably flares upwards and outwards above the teeth. In use, when the socket unit is incorporated in a shoe, the sockets project downwards into holes formed in a bottom part of the sole or heel. The holes are sufficiently large to accommodate the sockets and the teeth on the sockets. The flared part of the outer surface of each socket can engage and slightly deform that part of the bottom of the sole or heel bordering the upper end of the associated hole; consequently the plate is positively located relative to the bottom part of the sole or heel.

While the bottom part of the sole or heel is normally likely to comprise a single layer of leather or other material, such as a plastics material, it would be possible for the bottom part of the sole or heel to comprise two or more separately formed laminae of the same or of different materials.

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From a fourth aspect the present invention consists in an article of footwear provided with a plurality of downwardly opening sockets, each in accordance with the third aspect of the present invention.

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From a fifth aspect the present invention consists in an article of footwear in accordance with the fourth aspect of the present invention, in combination with a plurality of studs for said sockets, each stud being in accordance with the second aspect of the present invention.

An embodiment of the present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a view from beneath of a sole plate for incorporation in a golf shoe, but with some parts thereof omitted for clarity,

Figure 2 shows details of a socket and is a section, to a larger scale, on the line 2-2 of Figure 1,

Figure 3 is a view from beneath of the socket shown in Figure 2,

Figure 4 shows details of a tooth on the socket and is a side view of part of the socket shown in Figure 2, as viewed in the direction of the arrow A in Figure 2,

Figure 5 is a view from beneath of the support or body of a stud for use with a socket of the kind shown in Figure 2,

Figure 6 is a section on the line 6-6 of Figure 5,

Figure 7 shows details of a tooth on the stud and is a side view of part of the stud shown in

Figure 6, as viewed in the direction of the arrow B, and

5 Figure 8 is a scrap section through a socket with a stud support screwed into it, the socket forming part of a modified form of sole plate.

10 The sole plate illustrated in Figure 1 is intended for incorporation in the sole of a golf shoe, as described in more detail below. The sole plate comprises a unitary moulding of a suitable plastics material such as an acetal resin. The upper side (not shown) of the plate is flat, but the underside is shaped to provide various formations. Principal among
15 those formations are a plurality of sockets, 1, and a plurality of bands, 2. There are eight sockets in this particular embodiment but it is to be understood that a different number of sockets may be provided, if desired. Similarly the number of bands may be varied
20 as desired.

 The sockets are all of the same shape and size, so only one will be described in detail. The socket is open at its lower end and is closed at its upper end by
25 an integral closure disc 3 which is relatively thin as compared with the thickness of the remainder of the plate. The socket is formed internally with a screw-thread 4. The profile of the thread is similar to that described and illustrated in the specification
30 of British patent No. 2 115 683 of Triman Limited and will not be further described here. A plurality of teeth 5 are formed on the outside wall of the socket. For the sake of clarity, the teeth are not shown in Figure 1. In the embodiment illustrated in Figures 2
35 and 3 there are five such teeth, but a different number may be provided if desired. The teeth 5 are spaced

uniformly around the socket and are all of the same shape and size. As can be seen from Figure 4, each tooth is ratchet-shaped, having on one side a face 6 which is inclined to the axis of the socket and on the other side a face 7 which is parallel with that axis. The faces 6 and 7 are joined at their lower ends by a short end face 8 which is normal to the axis. The teeth are set back, above the lower end of the socket, as illustrated. The outer surface of each socket flares upwards and outwards above the teeth, as indicated at 9.

Each of the bands 2 constitutes an area of increased thickness of the plate and extends between two associated sockets. A central part of each band is of uniform thickness and is bordered on each side by a wedge-shaped part. In this way, sudden variations in thickness are avoided. An end portion of each band surrounds a socket and provides increased support for the socket. The bands 2 extend in a generally transverse direction across the width of the plate, and in consequence the bands do not interfere significantly with the transverse flexing of the sole plate such as can be expected to occur in use. It will be seen from Figure 2 that the closure disc 3 at the upper end of each is less thick than the main part of the plate; this enables the axial length of the interior of the socket to be made as long as possible.

The sockets 1 are intended for receiving studs. Each stud comprises a support 10 made of a plastics material such as an acetal resin and a metal pin element (not shown). The support 10 comprises an externally screw-threaded sleeve 11 which constitutes a spigot to be screwed into one of the sockets 1. The support also includes an outwardly directed flange 12.

The pin element comprises a stem and a ground-engaging head. In manufacture, the stem is inserted into the sleeve 11 and is deformed after insertion to secure the support and pin element permanently together. Studs of that kind are the subject of British patent No. 2 008 102 of Triman Limited and their construction will not be further described here. An annular retaining ring 13 projects upwards from the flange 12. The ring is spaced outwards from the sleeve 11 and is co-axial with it. In use, when the spigot is screwed into a socket, the lower end portion of the socket, below the teeth 5, enters the ring. The function of the retaining ring is described in British patent application No. 8518677 (publication No. 2 163 037A) referred to above and will not be further described here.

A plurality of teeth 14 project upwards from the top of the retaining ring 13. In the embodiment illustrated there are ten such teeth, but a different number may be provided if desired. Nevertheless, for reasons described below it is preferred to provide twice as many teeth on the stud as there are on the socket. As can be seen from Figure 7, each of the teeth 14, is ratchet-shaped, having a leading face 15 of curved shape, but of which an upper part is considerably inclined to the axis of the stud, and a trailing face 16 which is almost parallel with that axis.

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The flange 12 is generally saucer-shaped, having a convex underside and a concave upper side. Blind holes 17 are formed in the underside of the flange and serve to accept pins on a face spanner used for screwing the stud into and out of a socket. The blind holes 17 could be replaced by through holes if desired,

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though it is usually preferred to provide blind holes as through holes might provide a passage for dirt to enter and become trapped between the flange and the bottom of the article of footwear. The rim of the flange is of a shape unlike that of the flanges of the previous designs of stud in that its upper side tapers upwards. The taper is afforded by a frusto-conical face 18 which extends above an outermost cylindrical face 19. The provision of an upwardly tapering rim on the flange of a stud is of general application and is not restricted to studs of the kind that are the subject of the present invention.

It is, of course, to be understood that the rim of the flange may be of any other desired shape. For example, it may present a relatively sharp edge or a rounded edge; alternatively it may have an upstanding peripheral rib which in use tightly seals against the sole or heel of the article of footwear.

The sole plate and the associated studs is intended to operate in the following manner.

The sole plate is incorporated in a golf shoe which includes a sole of which the bottom part is made from a piece of leather. In manufacture, the piece of leather is trimmed to a substantially uniform thickness and is punched with circular holes so positioned that each hole can receive an associated one of the sockets 1 of the sole plate. The diameter of each hole is just great enough to enable the teeth 5 on the associated socket to enter the hole. If desired the hole-size may be such as to require the sockets to be lightly pressed into the holes so that the sole plate is held in place by friction. The leather around the lower end of each hole is milled away to provide a

shallow counterbore of a diameter slightly less than that of the cylindrical outer face 19 of the flange 12 of the stud. When the sole plate has been assembled with the piece of leather, with the sockets 1
5 projecting downwards into the holes, the lower end of each socket, below the teeth 5, is either flush with the upper end of the counterbore or projects a short way into the counterbore. The flared part 9 of each
10 socket engages and slightly compresses that part of the leather bordering the upper end of the associated hole. The central parts of the bands 2 bear on the upper face of the piece of leather but gaps are left between the remainder of the sole plate and the
15 leather. If desired those gaps could be filled with suitable packing material but that is not normally considered necessary.

The piece of leather assembled with the sole plate is then incorporated in the remainder of the shoe in a
20 conventional manner. In the course of manufacture the piece of leather tends to assume a lightly curved shape so that its undersurface is convex.

After the shoe is completed the spigots of the
25 studs are screwed into the sockets. While each stud is being screwed into position, the teeth 14 on the stud soon start to come into contact with the teeth 5 on the socket. As the leading faces 15 of the teeth 14
30 contact the inclined faces 6 of the teeth 5, the teeth 14 initially tend to yield resiliently and to ride past the teeth 5. As the spigot rises progressively in the socket, however, the teeth 14 tend to splay outwards as they pass by the teeth 5. In so
35 doing they tend to press into the leather bottom part of the sole bounding the hole in which the socket is housed. Were it not for the presence of the leather

there might also be a tendency for the teeth 5 to become deformed. The presence of the leather, however, which abuts the part-cylindrical outer face of the tooth, does tend to prevent that happening.

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When the stud is fully screwed into place, the lower end of the socket abuts the upper surface of the flange 12 inside the retaining ring 13. There are then strong frictional forces resisting the unscrewing of the stud. Meanwhile the rim of the flange 12 has entered the counterbore in the leather bottom part of the sole, and the frusto-conical face 18 of the rim has lightly and resiliently crushed the leather bordering the counterbore. This arrangement has several advantages. One is that in entering the counterbore, the rim of the flange tends to pull the counterbore into a more truly circular shape, for it is likely to have become slightly elliptical during manufacture owing to the fact that the leather has become slightly curved. Another advantage is that the extent to which the flange 12 projects below the shoe is much reduced, and the resultant indentation of any golfing green on which a user may walk is correspondingly lessened. In fact, only a central part of the flange projects below the level of the adjacent part of the undersurface of the shoe. Finally, another advantage is that when the shoe is in use and the sole flexes, any slight relative movement that may occur between part of the sole and part of the flange 12 is normally insufficient to cause the rim of the flange to leave the counterbore. Thus, no gap appears between the flange and the sole into which earth or grass might enter in use.

As described above, there are often a number of advantages in providing counterbores in the underside of an article of footwear for receiving the outer parts

of the flanges of the studs. Nevertheless, the provision of counterbores is not an essential feature of the present invention, and they may, if desired, be omitted. In such cases the lower ends of the sockets
5 may then be flush with the underside of the article of footwear or may project below the underside.

Also, when the stud is fully screwed into place the end faces 8 of the teeth 5 are spaced only a very
10 small distance above the upper edge of the retaining ring 13. It is quite likely that the five teeth 5 are engaged by five of the teeth 14, and that those teeth 14 are inclined outwards into the leather. The remaining five of the teeth 5, however, remain
15 unengaged and return to their original shapes.

If, now, for any reason the stud starts to work loose, the trailing faces 16 of the teeth 14 lying between the teeth 5 soon come into abutment with the
20 faces 7 of the teeth 5 and thus prevent further rotation of the stud relative to the socket. As the abutting faces of the teeth are substantially parallel with the axis of rotation, there is considerable resistance to further unscrewing of the stud.
25 Nevertheless, if it is desired to remove the stud entirely, for example when the ground-engaging head of the pin element has become worn, the stud can be unscrewed with the aid of a suitable face spanner. As the stud is rotated, those of the teeth 14 that are
30 splayed outwards and are projecting into the leather snap off and become embedded in the leather, while the remainder of the teeth, which quickly come into abutment with the teeth 5 also snap off. When the stud is finally withdrawn, those teeth 14 that were embedded
35 in the leather drop free quite readily. The removal of the teeth 14 from the stud make the stud unsuitable for

re-use and enable the used stud to be readily distinguished from a new, unused stud.

5 If it so happens that during its installation the stud is not quite fully screwed into the socket, there are few frictional forces helping to hold the stud in place. The interengagement of the teeth, however, in the manner described above, normally serves to prevent the stud becoming unscrewed, either wholly or partially.

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In the manner of operation described above, the teeth 14, in passing the teeth 5, tend to splay outwards and enter the surrounding leather. It might be expected that a permanent annular groove would therefore be formed in the leather, but it is in fact found that this does not occur and that the leather gradually returns substantially to its initial shape. This is thought to be a consequence of the fibrous nature of leather. This helps in snapping off the teeth, as described above. Nevertheless, if a plastics material is used instead of leather (and that is a possible alternative), a more permanent groove may be formed by the teeth 14 as the stud is being screwed into place. This, however, is not fatal to the operation of the invention as the unsplayed teeth 14 prevent the unintentional unscrewing of the stud, as described above. Moreover, when the stud is positively and forcefully unscrewed, the unsplayed teeth 14 snap off on engagement with the teeth 5, while the splayed teeth tend quickly to resume their initial shapes and may also be snapped off by abutment with the teeth 5. Even if a few of the splayed teeth pass outside the teeth 5 and remain on the stud, the absence of the remainder is immediately evident.

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Somewhat unexpectedly it has been found that when a shoe of the kind described above has been used, there is little or no tendency for the leather (or other) part of the sole below the sole plate to be pressed up between the bars 2 of the sole plate and thus display an uneven surface. In fact, the bottom surface of the shoe tends to remain unaffected by the presence of the ribs 2 and the gaps between them.

It is desirable to avoid or overcome any tendency there may be in use for the holes in the bottom part of an article of footwear to open out. In the embodiment of the invention described above, for example, where it is intended that the rim of the flange 12 should seat tightly in the associated counterbore in the bottom part of the sole or heel, it is desirable to avoid or overcome any tendency for the counterbore, with its associated hole, to open out. Moreover, in the embodiment described above, the provision of the flared part 9 on each socket may tend to displace downwards that portion of the bottom part of the article of footwear immediately bordering the hole, so that the lower end of the hole is encouraged to flare outwards.

To overcome or reduce such problems or tendencies there may be provided a formation on or in the underside of the socket unit extending around each socket, each formation affording, within it, an upwardly extending recess somewhat larger in extent than the flange on the associated stud so that in use, when the stud is tightened into place its flange tends to urge the adjacent part of the bottom part of the article of footwear into the recess. The formation may be formed merely by providing a recess, such as a circular recess, in the socket unit. Preferably, however, the formation comprises an annular rib

concentric with the associated socket and of a diameter somewhat greater than that of the rim of the associated stud. An embodiment of the invention incorporating such a rib is illustrated in Figure 8 in which there is shown part of a sole plate 20, with a socket 21 similar to the socket 1 shown in Figures 2 and 3. The sole plate 20, however, differs from that shown in Figure 1 in that its undersurface is not provided with the bands 2 and is flat over most of its extent. The support 22 of a stud is shown as being fully engaged with the socket 21, the support being of the same design as that of the support 10 illustrated in Figures 5 and 6. Parts of the socket 21 and support 22 are given the same reference numerals as those given to corresponding parts of the socket 1 and support 10. An annular rib 23 is formed on the undersurface of the sole plate 20. The rib is of semi-circular cross-section and is concentric with the socket 21. A similar rib is formed round each socket of the sole plate.

The bottom part of the sole is indicated by the chain-dotted line 24. Initially it is of uniform thickness and is formed with a hole 25 for receiving the socket 21. The hole has a counterbore 26 at its lower end for receiving the rim of the flange 12 of the support 10. As described above, that part bordering the top of the hole 25 is slightly deformed by the flared part 9 of the socket, while the rim of the flange lightly compresses the part bordering the counterbore. In use, when the stud is screwed fully into place in the socket, the rim of its flange 12 presses up against the bottom of the shoe. That part of the bottom of the shoe vertically above the rim and adjacent to the socket unit is disposed just inside the annular rib 23 on the unit. The upward force applied

by the rim of the flange to this part of the bottom of the shoe, which is indicated by the arrow 27, tends to press the bottom of the shoe upwards against the socket unit just inside the annular rib. The rib 23 therefore
5. exerts a downward force on the bottom part of the sole, as indicated by the arrow 28. Consequently that part of the bottom of the shoe between the annular rib 23 and the hole 25 is subjected to a couple which tends to
10 urge it radially inwards so as to assume a shape such that the lower end of the hole 25, with the counterbore 26, is reduced in diameter, while the upper end of the hole is urged radially outwards. The height of the annular rib 23 need not be great to achieve the desired effect.

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The embodiment of the invention described above with reference to the drawings relates largely to a sole plate, but it is to be understood that it is equally applicable to a socket unit for incorporation
20 in the heel of a golf shoe or other article of footwear.

It will also be appreciated that the provision of an annular rib 23 or of some other formation preforming
25 a similar function is applicable to other kinds of socket units and in particular may be of value with socket units in which the sockets are not provided with teeth and co-operate with studs that are not provided with teeth.

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CLAIMS

1. In combination, an internally screw-threaded socket, for an article of footwear, and a stud with an
5 externally screw-threaded spigot which can be screwed into the socket, the stud being provided with teeth which are spaced outwards from the spigot and can interengage complementary teeth on the outside of the socket, the arrangement being such that in use, when
10 the spigot is screwed into the socket the teeth interengage to prevent the stud being freely unscrewed.
2. A combination of socket and stud according to claim 1 in which the teeth on the stud are frangible,
15 the arrangement being such that when the spigot of the stud has been screwed into the socket and the teeth on the stud and socket have become interengaged to at least a predetermined extent, the action of unscrewing the stud from the socket causes at least some of the
20 teeth of the stud to break off.
3. A combination of socket and stud according to either preceding claim in which the arrangement is such that in whatever relative rotational positions the stud
25 and socket are when the stud is screwed into the socket, at least some of the teeth on the stud are free to assume their natural shapes rather than being deformed by contact with the teeth on the socket.
- 30 4. A combination of socket and stud according to claim 3 in which the number of teeth on the socket is different from the number of teeth as the stud.
- 35 5. A combination of socket and stud according to claim 4 in which the number of teeth on the socket is less than the number of teeth on the stud.

6. A combination of socket and stud according to any preceding claim in which the teeth on the socket are uniformly spaced around the socket.

5 7. A combination of socket and stud according to any preceding claim in which the teeth on the stud are uniformly spaced around the stud.

8. A combination of socket and stud substantially as
10 hereinbefore described with reference to the accompanying drawings.

9. A stud with an externally screw-threaded spigot which can be screwed into an internally screw threaded
15 socket, for an article of footwear, the stud being characterised in that it is provided with teeth that are spaced outwards from the spigot and can engage complementary teeth on the outside of the socket when
20 the spigot is screwed into the socket, that interengagement serving to prevent the stud being freely unscrewed.

10. A stud according to claim 9 in which the teeth on the stud are ratchet-shaped so that the faces they
25 present to the teeth of a complementary socket, when the stud is being screwed into such a socket, are inclined to the axis of rotation and afford less resistance to rotation than would occur if the faces were parallel with the axis of rotation, while the
30 faces they present to the teeth of that socket when a torque is applied to the stud in the direction necessary for the unscrewing of the stud from the socket are either not inclined to the axis of rotation or are inclined more steeply than the aforementioned
35 faces.

11. A stud according to either of claims 9 and 10 in which the teeth are provided on a retaining ring spaced outwards from the spigot and adapted to receive an end portion of a complementary socket which resists a tendency for that portion of the socket to expand outwards in use.
12. A stud according to any one of claims 9 to 11 in which the spigot and the teeth of the stud are formed from a plastics material as parts of the same moulding.
13. A stud according to any of claims 9 to 12 in which the stud has an outwardly directed flange, disposed below the spigot and the teeth, which flange can in use engage the underside of an article of footwear on which the stud is mounted.
14. A stud substantially as hereinbefore described with reference to Figures 5 to 8 of the accompanying drawings.
15. A internally screw-threaded socket, for an article of footwear, the socket being characterised in that it is provided on its outer surface with a plurality of teeth for interengagement with complementary teeth on a stud having an externally screw-threaded spigot that can be screwed into the socket, the interengagement of the teeth on the socket and on the stud serving to prevent the stud from being freely unscrewed.
16. A socket according to claim 15 in which the teeth on the socket are ratchet-shaped so that the obstruction that they afford to the teeth of a complementary stud, when the stud is being screwed into the socket, is less than the obstruction they afford to

the teeth on such a stud when it is being unscrewed from the socket.

5 17. A socket according to either of claims 15 and 16 in which the teeth in the socket are set back from the lower end of the socket so that an end portion of the socket, without teeth, can be received by complementary retaining means on a stud.

10 18. A socket substantially as hereinbefore described with reference to Figures 1 to 4 and 8 of the accompanying drawings.

15 19. A socket unit for an article of footwear, comprising a plurality of similar sockets each in accordance with any one of claims 15 to 18.

20 20. A socket unit according to claim 19 which is in the form of a plate from the underside of which said sockets project.

21. A socket unit according to claim 20 in the upper face of the unit is flat.

25 22. A socket unit according to either of claims 20 and 21 in which thicker areas of the plate form bands, each of which extends across the plate between a pair of associated sockets.

30 23. A socket unit according to any one of claims 19 to 22 in which the outer surface of each socket flares upwards and outwards above the teeth.

35 24. A socket unit according to any one of claims 19 to 23 in which a downwardly directed annular rib is

provided around each socket and is spaced radially outwards beyond the socket.

5 25. A socket unit substantially as hereinbefore described with reference to Figures 1 to 4 of the accompanying drawings.

10 26. An article of footwear provided with a plurality of downwardly opening sockets, each in accordance with any one of claims 15 to 18.

15 27. An article of footwear provided with at least one socket unit in accordance with any one of claims 19 to 25.

20 28. An article of footwear according to either of claims 26 and 27 in combination with a plurality of studs for said sockets, each stud being in accordance with any one of claims 9 to 14.

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